

HOMEWORK: SET 2

Factor Label Word Problems

1. If your heart pumps blood at a rate of 6.8 fluid ounces per second, then what is this rate in gallons per hour (1 quart = 32 fluid ounces)

$$\frac{6.8 \text{ fl oz}}{\text{s}} \left(\frac{1 \text{ qt}}{32 \text{ fl oz}} \right) \left(\frac{1 \text{ gal}}{4 \text{ qt}} \right) \left(\frac{60 \text{ s}}{1 \text{ min}} \right) \left(\frac{60 \text{ min}}{1 \text{ hr}} \right) = 19.25 = \boxed{\frac{19.0 \text{ gal}}{\text{hr}}}$$

2. The fastest recorded hard baseball pitch is allegedly 108 mph. What is this in m/s? (1 mile = 5280 feet)

$$\frac{108 \text{ mi}}{\text{hr}} \left(\frac{5280 \text{ ft}}{1 \text{ mi}} \right) \left(\frac{12 \text{ in}}{1 \text{ ft}} \right) \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right) \left(\frac{1 \text{ m}}{100 \text{ cm}} \right) \left(\frac{1 \text{ hr}}{60 \text{ min}} \right) \left(\frac{1 \text{ min}}{60 \text{ s}} \right) = 48.28032 = \boxed{48.3 \text{ m/s}}$$

3. A cube of gold is 4.02cm on each side. What is its mass in grams?

$$D = \frac{M}{V} \quad M = DV \quad \frac{19.3 \text{ g}}{\text{cm}^3} \left(\frac{4.02 \text{ cm} \times 4.02 \text{ cm} \times 4.02 \text{ cm}}{1} \right) \text{ or } \frac{19.3 \text{ g}}{\text{cm}^3} \left(\frac{4.02 \text{ cm}}{1} \right)^3 = 1253.82 = \boxed{1250 \text{ g}}$$

4. In order to earn \$42,000 per year, how much per hour must your salary be? Assume that you work 50 weeks per year, 5 days per week, 8 hours per day.

$$\frac{\$42,000}{\text{yr}} \left(\frac{1 \text{ yr}}{50 \text{ wk}} \right) \left(\frac{1 \text{ wk}}{5 \text{ day}} \right) \left(\frac{1 \text{ day}}{8 \text{ hr}} \right) = \boxed{\$21/\text{hr}}$$

5. An exchange student lands on Mars and finds a chemical supply house. She needs 140 grams of dilithium crystals to continue her experiments. The Martian supplier asks her, "How many zoops of dilithium do you need?" She thinks, "Oh no, Mrs. Pav was right! I have to do unit conversions." She refers to her super-electronic memory enhancer and finds out the following:

9 poofs (pf) = 1 gram (g)	2 fings (fn) = 7 warps (wp)
8 poofs = 3 warps	4 zoops (zp) = 3 fings

How many zoops did she finally request?

$$140 \text{ g} \left(\frac{9 \text{ pf}}{1 \text{ g}} \right) \left(\frac{3 \text{ wp}}{8 \text{ pf}} \right) \left(\frac{2 \text{ fn}}{7 \text{ wp}} \right) \left(\frac{4 \text{ zp}}{3 \text{ fn}} \right) = \boxed{180 \text{ zoops}}$$

6. A car going 15 miles per hour is traveling how many meters per second? (1km = 0.621miles)

$$15 \text{ mph} \quad \frac{15 \text{ mi}}{\text{hr}} \left(\frac{5280 \text{ ft}}{1 \text{ mi}} \right) \left(\frac{12 \text{ in}}{1 \text{ ft}} \right) \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right) \left(\frac{1 \text{ m}}{100 \text{ cm}} \right) \left(\frac{1 \text{ hr}}{60 \text{ min}} \right) \left(\frac{1 \text{ min}}{60 \text{ s}} \right) = 6.7056 = \boxed{\frac{6.7 \text{ m}}{\text{s}}}$$